



Hello!

Hi, I'm Nicole! With over 25 years as a pediatric speech-language pathologist specializing in motor speech disorders, I currently teach at New York University and lead an NIH-funded Childhood Apraxia of Speech study at NYU's Motor Speech Lab. I'm passionate about sharing my experiences at national conferences and love collaborating to advance innovative and effective strategies in speech-language pathology.

I am so happy to share with you **My 3 FAVORITE Childhood Apraxia of Speech (CAS) Resources**—from differential diagnosis to goal writing and treatment.

Use this guide for efficient clinical planning, goal writing, and implementing effective motor-based speech therapy for children with CAS.

—Nicole

1. ProCAD Auditory-Perceptual Feature Rating Checklist

Quick Description: A diagnostic checklist used to rate and differentiate auditory-perceptual speech features to aid in distinguishing between childhood apraxia of speech and pediatric dysarthria.

Child's Name _____ Clinician's Name _____ Date of Evaluation _____

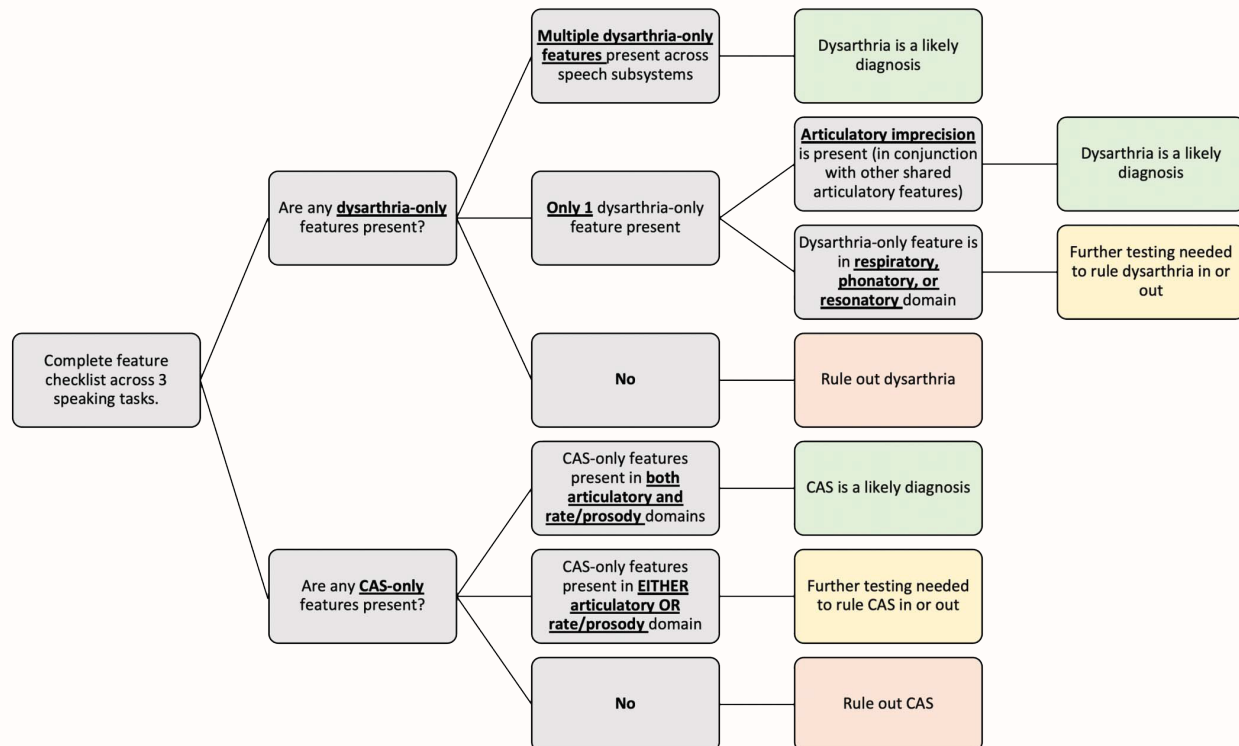
ProCAD (Profile of Childhood Apraxia of speech and Dysarthria) Auditory-Perceptual Feature Rating Checklist

Speech Subsystem	Speech Feature		Dysarthria/ CAS/ Both	Speech Task 1	Speech Task 2	Speech Task 3
Respiration/ Phonation (R/P)	Volume	Low volume or loudness decay	Dysarthria ^{*,***}			
		Excessive loudness	Dysarthria ^{*,**,***}			
		Excess loudness variation	Dysarthria ^{*,***}			
	Speech breathing	Effortful/ Audible inspiration	Dysarthria ^{*,***}			
		Short breath groups	Dysarthria ^{*,***}			
	Atypical voice quality		Dysarthria ^{*,**,***}			
Resonance (Res)	Fluctuating resonance/intermittent hyper/hyponasality		Both ^{*,***, †}			
	Consistent hypernasality (with or without nasal emission)		Dysarthria ^{*,**,***}			
Rate/ Prosody (Pros)	Slow rate		Both ^{*,**,***} , †,††			
	Atypical stress/reduced stress		Both ^{*,**,***} , †,††			
	Lexical stress errors		CAS ^{†,††}			
	Syllable segregation		CAS ^{†,††}			
Articulation (Artic)	Imprecise articulatory contacts		Dysarthria [*]			
	Consonant distortions		Both ^{*,**,***} , †,††			
	Vowel errors		Both ^{*,**,***} , †,††			
	Voicing errors		Both ^{*,**} , †,††			
	Intrusive schwa		CAS ^{†,††}			
	Groping (articulatory searching)		CAS ^{†,††}			
	Increased difficulty with multisyll. words		CAS ^{†,††}			
	Difficulty with initial artic configs/ transitional movement gestures		CAS ^{†,††}			
# Dys-only features						
# CAS-only features						
# Total features						
Subsystems involved			☐ R/P ☐ Res ☐ Pros ☐ Artic	☐ R/P ☐ Res ☐ Pros ☐ Artic	☐ R/P ☐ Res ☐ Pros ☐ Artic	
Diagnosis						
Severity						

*Duffy 2019, **Workinger & Kent, 1992, *** Scholderle et al, 2020, †Iuzzini-Seigel, Hogan & Green, 2017, ††Shriberg, Potter & Strand, 2011

Citation: Iuzzini-Seigel, J., Allison, K. M., & Stoeckel, R. (2022). *A Tool for Differential Diagnosis of Childhood Apraxia of Speech and Dysarthria in Children: A Tutorial*. Language, Speech, and Hearing Services in Schools, 53, 926-946.

ProCAD Diagnostic Flow Chart



(Iuzzini-Seigel, Allison, & Stoeckel, 2022)

Citation: Iuzzini-Seigel, J., Allison, K. M., & Stoeckel, R. (2022). *A Tool for Differential Diagnosis of Childhood Apraxia of Speech and Dysarthria in Children: A Tutorial*. *Language, Speech, and Hearing Services in Schools*, 53, 926-946.

2. ABCDs of Goal Writing for CAS

Quick Description: A systematic framework to guide clinicians in writing effective goals tailored specifically for motor-based intervention in children with CAS. Emphasizes the critical components: Audience, Behavior, Conditions, and Degree (ABCD).

Use this guide for efficient clinical planning, goal writing, and implementing effective motor-based speech therapy for children with CAS.

CAS ABCD Framework for Goal Writing

A ACTOR	
☐ Person	Client, name, student, patient, child
B BEHAVIOR	
Movement gesture (across whole target)	
☐ Movement transition	Initial articulatory configuration and smooth movement transitions between sounds and syllables
☐ AND Segments	Consonants AND vowels
☐ AND Prosody	Rate, intonation, and stress
C CONDITIONS	
Target Conditions	
☐ Content	Real words (meaningful to child through shared decision making; (consider language abilities) vs. nonsense words
☐ Word structure	Consonant–vowel (CV) vs. CVC vs. VCV, etc.
☐ Length	Single-syllable vs. multisyllabic sequences; words vs. phrases vs. sentence vs. conversation
☐ Phonemes	In inventory/stimulable; monophthongs/diphthongs; specific vowels in error
☐ Prosody	Stress pattern (trochaic, iambic, phrasal), inflection (happy, sad, question)
Communication Conditions	
☐ Communication environment	Structured vs. natural environment
☐ Communication participation	Targets are anchored in communication participation
☐ Communication partner	Clinician, peer, family member, Alexa/Siri
Elicitation Conditions	
☐ Elicitation method	Simultaneous, direct imitation, delayed imitation, spontaneous
Cueing and Feedback Conditions	
<i>Cues for upcoming trial:</i>	
☐ Type	Visual, verbal, gestural, tactile, multisensory cues
☐ Degree	Maximum, moderate, minimal, none
<i>Feedback for previous trial:</i>	
☐ Type	Knowledge of performance (specific to movement) vs. knowledge of results (specific to accuracy)
☐ Degree	After every trial, intermittent, none
☐ Frequency	Immediately after production vs. 2–3 s after production
Practice Conditions	
☐ Distribution	Mass (# practice trials together at one time point) vs. distributed (# practice trials spread over time)
☐ Schedule	Blocked (targets practiced in a predictable order) vs. random (targets practiced in an unpredictable order)
☐ Variability	Constant (practice in one condition) vs. varied (practice in varied conditions)
D DEGREE	
☐ Accuracy criteria	Stable accuracy across multiple data points (% accurate across # sessions, cumulative accuracy, periodic probe scores)
☐ Amount of practice	Target number of trials (i.e., high amount of trials without negative practice)

Case, Caspari, Aggarwal & Stoeckel, 2023

Citation: Case, J., Caspari, S., Aggarwal, P., & Stoeckel, R. (2024). *A Goal-Writing Framework for Motor-Based Intervention for Childhood Apraxia of Speech*. American Journal of Speech-Language Pathology.

Considerations for Motor-Based Intervention

CAS Considerations for Motor-Based Intervention

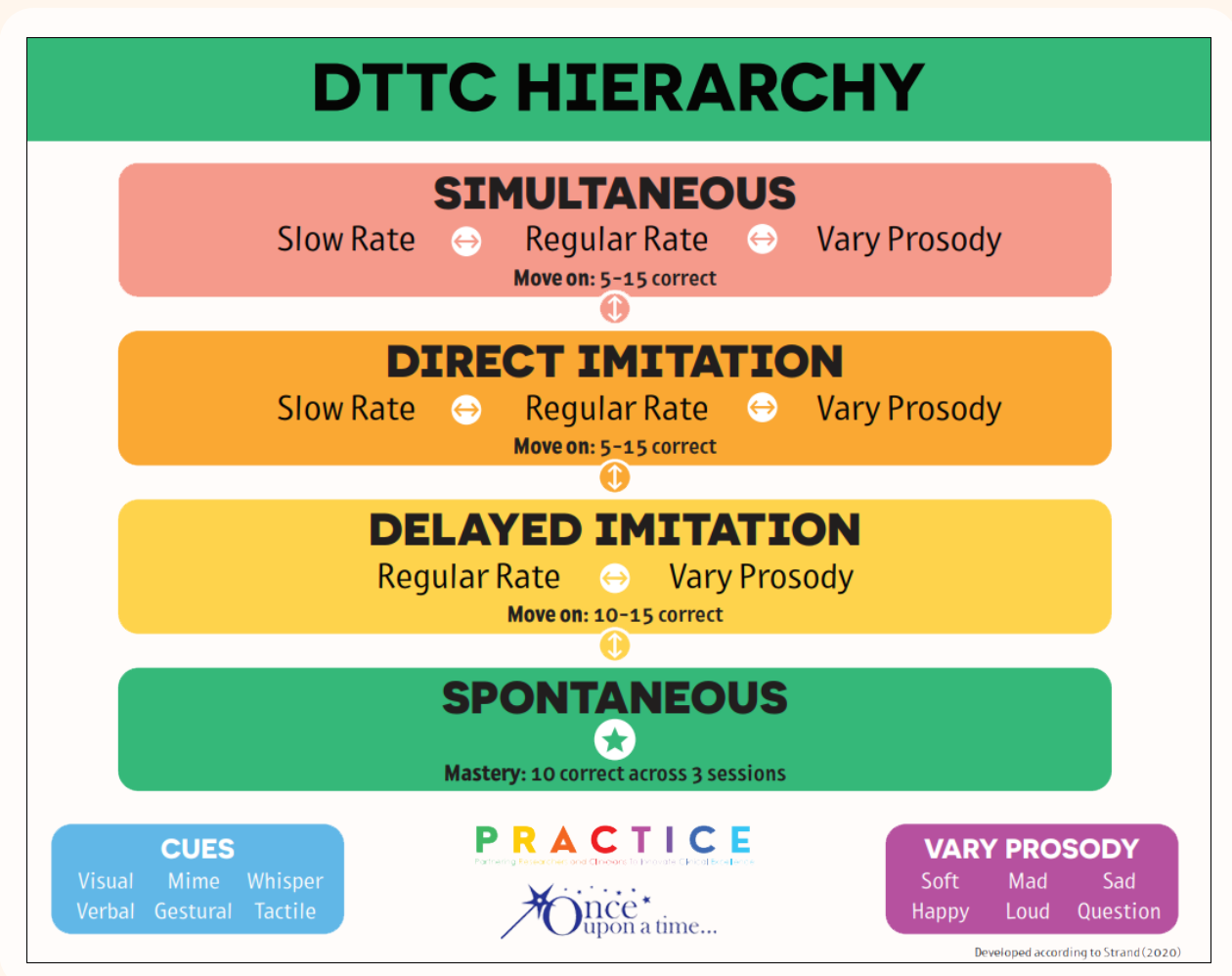
Challenge Point/Target Selection ^[a]		
C	☐ Targets are challenging but <i>achievable</i> with up to maximum cues and contain a variety of: ☐ Phonemes – consonants (C) AND vowels (V)☐ Word shapes (CV, VC, CVC, VCV, CVCV, etc.)☐ Coarticulatory transitions across syllables and phonemes (changes in consonant place/manner/voicing and vowel features)☐ Prosodic contexts (lexical, phrasal stress; trochaic/iambic patterns) ☐ Targets are optimal for language (parts of speech, semantic relationships, morphology, and communicative functions)	
All Aspects of Movement ^[b]		
A	☐ Production accuracy is based on the <i>whole</i> target (syllable sequences, word, phrase) during treatment, simultaneously achieving: ☐ Accurate consonants and vowels☐ Ability to achieve the initial articulatory position☐ Ability to achieve smooth coarticulatory transitions across sounds, sequences, and syllables (no pauses or elongations)☐ Accurate prosody, including the ability to maintain accurate consonants and vowels with changes in prosody☐ Ability to coordinate movement across articulatory, resonatory, phonatory, and respiratory subsystems	
Structure, Schedule, & Feedback ^[c]		
S	ACQUISITION → RETENTION	
	☐ Practice distribution: ☐ Practice schedule:☐ Practice amount:☐ Practice variability:☐ Feedback type:☐ Feedback frequency:☐ Feedback timing:	MassBlockedHighConstantKnowledge of Performance (KP)FrequentImmediate DistributedRandomHighVariableKnowledge of Results (KR)NoneDelayed
^a Guadagnoli & Lee, 2004; Iuzzini-Seigel et al., 2023; McAllister, Hitchcock & Ortiz, 2021 ^b Schmidt & Lee, 2005; Smith, 2006; Strand, 2020 ^c Maas et al., 2008		

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Citation: Case, J., Caspari, S., Aggarwal, P., & Stoeckel, R. (2024). *A Goal-Writing Framework for Motor-Based Intervention for Childhood Apraxia of Speech*. American Journal of Speech-Language Pathology.

3. DTTC Hierarchy Chart

Quick Description: The Dynamic Temporal and Tactile Cueing (DTTC) hierarchy is a structured progression that guides clinicians from simultaneous production to spontaneous speech, incorporating varied prosodic and rate conditions. Visual, verbal, tactile, and gestural cues are adjusted dynamically based on the child's response.



Citation: Strand, E. A. (2020). *Dynamic Temporal and Tactile Cueing: A Treatment Strategy for Childhood Apraxia of Speech*. American Journal of Speech-Language Pathology, 29, 30-48